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09/864,890	05/23/2001	Terje A. Skotheim	MT-0026.3	3358

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SQUIRE, SANDERS & DEMPSEY LLP
TWO RENAISSANCE SQUARE
40 NORTH CENTRAL AVENUE
SUITE 2700
PHOENIX, AR 85004-4498

EXAMINER

WILLS, MONIQUE M

ART UNIT PAPER NUMBER

1746

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/864,890

Applicant(s)

SKOTHEIM ET AL.

Examiner

Monique M Wills

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-35 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 16-35 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 23 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the amendment filed May 11, 2004. The following rejections have been overcome for the reason that claims 1-15 have been canceled:

- Claims 1, 2, 4-6 & 10-11 under 35 U.S.C. §102 (b) as being anticipated by Kawakami et al. U.S. Patent 5,824,434.
- Claim 3 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Bates U.S. Patent 5,569,520.
- Claim 7 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Bates U.S. Patent 5,314,765.
- Claim 9 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Ying U.S. Patent 6,277,514.
- Claim 8 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Gozdz U.S. Patent 5,429,891.
- Claim 15 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Koksang U.S. Patent 5,387,479.

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- Claims 12-14 under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Zhuang et al. The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

The rejection of claims 16-20 as being rejected under 35 U.S.C. §103 (a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434, as applied to claim 1, in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, is withdrawn. However claims 16-17 & 19-20 are rejected, on new grounds, under 35 U.S.C. §102(b) as being anticipated by Kawakami et al, U.S. Patent 5,824,434. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

Newly added claims have been treated as follows:

- Claim 29 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.
- Claims 21-29 & 30-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.
- Claims 16-17 & 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawakami et al, U.S. Patent 5,824,434.
- Claims 21-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Chu et al., U.S. Patent 6,402,795.

- Claims 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodd U.S. Patent 5,522,955 in view of Stachoviak et al., U.S. Patent 6,117,593.
- Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brodd U.S. Patent 5,522,955, as applied to claim 30 above, in view of Chu et al., U.S. Patent 6,402,795.
- Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

Claim Objections

Claim 29 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The instant claim necessitates the electroactive sulfur-containing material to comprise sulfur. However, claim 25, expressly required that the electroactive material to contain sulfur.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 21-29 & 30-35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 21 & 25 necessitate “an anode active layer comprising lithium metal and lithium oxide” however; the disclosure does not provide support for a single anode layer comprising both lithium metal and lithium oxide. See page 3, lines 15-25 & page 15, lines 20-25. On the contrary, the specification provides support for an anode comprising two distinct layers, one layer of lithium metal and a second layer of lithium oxide. Therefore, the limitation in claim 21 will be interpreted as requiring an anode active layer comprising a layer of lithium metal and a layer of lithium oxide.

Claims 22-24 and claims 26-29 are rejected based on their dependency to claims 21 and 25, respectively.

Claim 30 necessitates a method comprising “providing a moving substrate” and “providing gaseous material adjacent to the lithium depositing nozzle” however, the disclosure does not provide support for a moving substrate or a nozzle.

Claims 31-35 are rejected based on their dependency to claim 30.

Claim Interpretation

In claim 21, the term “anode active layer comprising lithium metal and lithium oxide” is interpreted as an anode active layer comprising a layer of lithium metal and a layer of lithium oxide.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 16-17 & 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawakami et al, U.S. Patent 5,824,434.

With respect to claim 16, Kawakami teaches an anode for an electrochemical cell comprising a lithium metal layer (col. 22, ll 62-68) coated with nitrogen gas (col. 23 ll 36-42) and a current collector substrate (col. 21, lines 28-32). The limitation with respect to lithium metal being “co-deposited in-situ with one or more gaseous materials” is not given patentable weight, because the presence of process limitations in product claims, where the product does not otherwise patentably distinguish over the prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965). Furthermore, the claim only differs from Kawakami by its method of production. In accordance with MPEP 2113, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, since the process steps are not given patentable weight, the method limitations of claim 1 do not patentably distinguish the instant anode from that of Kawakami.

With respect to claim 17, the gaseous material is nitrogen(col. 23 ll 36-42).

Concerning claim 19, the substrate 005, is an insulator made of polymer film (col. 27, lines 5-10).

With respect to claim 20, the anode further comprises: a multi-layered structure including an electrolyte layer 006 and conductive layer 003; an anode active layer 001; and a substrate insulator 005 interposed therebetween. See Figure 8 and column 23 lines 64-68 through column 24, lines 1-5. Therefore, the instant claims are anticipated by the prior art set forth.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 21-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Chu et al., U.S. Patent 6,402,795.

With respect to claim 21, Chu teaches a negative electrode comprising a protective layer, lithium metal layer and current collector substrate (abstract). The current collector is a metallized plastic sheet or other metallized insulating sheet (col. 3, lines 18-25). The protective layer is a modifier/network former glass having the general formula $(M_2O)_x(A_nD_m)$ where M is an alkali metal, A is boron, aluminum, silicon or phosphorous & D is oxygen or sulfur.

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Specific examples include lithium oxides, such as, Li_3BO_3 , $\text{Li}_2\text{OB}_2\text{O}_3$, Li_3AlO_3 or $\text{Li}_2\text{OAl}_2\text{O}_3$. See column 9, lines 50-55.

In re claims 22,23 & 26-28, the claims are product-by-process claims rendering the same product as the prior art. The claims only differ from Chu by their method of production. In accordance with MPEP 2113, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, since the process steps are not given patentable weight, the method limitations of claims 22,23 & 26-38 do not patentably distinguish the anode active material from that of Chu.

Regarding claim 24, the anode substrate is a current collector made of a metallized plastic sheet. See column 3, lines 18-25.

In re claims 25 & 29, the reference teaches an electrochemical cell comprising: an electroactive sulfur-containing cathode (col. 13, lines 30-40); an anode comprising a lithium layer (abstract) and lithium oxide layer (col. 9, lines 50-55); and an electrolyte interposed between the anode and cathode (col. 11, lines 49-60 & Fig. 1).

Therefore, the instant claims are anticipated by Chu.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodd U.S. Patent 5,522,955 in view of Stachowiak et al., U.S. Patent 6,117,593.

In re claim 30, Brodd teaches a method of making an anode for an electrochemical cell comprising: providing a moving substrate (col. 6, lines 12-15); moving the substrate continuously past a lithium vapor deposition source (col. 7, lines 19-22 & col. 8, line 29); providing gaseous material (col. 7, lines 28-30) adjacent the lithium deposition source 60 (Fig. 7); condensing lithium vapor on the substrate in the presence of gaseous material to co-deposit lithium anode active layer to form the anode (Fig. 7 and col. 7, lines 15-35). With respect to claim 31, the vapor is condensed on the substrate by contacting it with a cooled surface, as the substrate passes through the vapor source (col. 7, line 25-31). With respect to claims 32 & 33, the lithium layer is coated with a thickness of 12 to 30 microns (col. 8, lines 28-30). In re claim 34, the substrate is a copper foil (col. 8, lines 28-30).

Brodd is silent to lithium vapor being deposited on the substrate through a nozzle.

Stachowiak teaches that it is conventional to fabricate metallic anodes, by spraying metal droplets through a nozzle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the nozzle of Stachowiak, in the process of Brodd, in order control the coating rate to form a generally continuous layer on the electrode substrate.

The skilled artisan recognizes that spray dimension is a function of the distance from the emission nozzle to the substrate, as evidenced by Stachoviak at column 10, lines 40-45.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brodd U.S.

Patent 5,522,955, as applied to claim 30 above, in view of Chu et al., U.S. Patent 6,402,795.

Brodd teaches a method of fabricating an anode comprising lithium metal and a copper foil substrate (col. 8, lines 25-30).

Brodd is silent to a polymer film substrate comprising polyethylene terephthalate.

Chu teaches that it is conventional to employ polymer films such as polyethylene terephthalate, because the current collector may be much thinner than free-standing current collectors. See column 5, lines 55-65.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the polyethylene terephthalate polymer film of Chu, in the electrode of Brodd, in order to form a relatively lightweight backing/current collector for the electrode.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

Kawakami teaches a method of making a multi-structured anode as described in the §102 (b) rejection hereinabove. The reference also teaches surface treating lithium metal with nitrogen (col. 23 ll 36-42).

Kawakami does not expressly disclose co-depositing lithium metal with carbon dioxide.

Zhang teaches that it is conventional to treat lithium anodes with carbon dioxide to produce elemental carbon on the surface of the anode (page 146).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ carbon dioxide gas of Zhang, to treat the lithium metal electrode of Kawakami, in order to increase conductivity of the anodic material.

Response to Arguments

Applicant correctly points out that the rejections of claims 1-15 are now moot because of the cancellation of said claims.

Applicant's arguments with respect to claims 16-20 have been considered but are moot in view of the new ground(s) of rejection. Claims 16-17 & 19-20 are newly rejected under 35 U.S.C. §102(b) over Kawakami et al., U.S. Patent 5,824,434. The Examiner erroneously gave weight to the "co-deposited in situ" limitation of the instant claims. Specifically, the limitation with respect to lithium metal being "co-deposited in-situ with one or more gaseous materials" is not given patentable weight, because the presence of process limitations in product claims, where the product does not otherwise patentably distinguish over the prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965). Furthermore, the claim only differs from Kawakami by its method of production. In accordance with MPEP 2113, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, Kawakami anticipates, rather than being obvious over the instant claims.

Assuming, arguendo, that the "co-deposited in situ" limitation should be given patentable weight, Applicant's arguments with respect to unexpected ameliorative results is not persuasive, because the Applicant has not provided evidence in proper form. Tables and Examples are provided as evidence of alleged unexpected results (pages 6-9 of the

amendment). However, arguments of counsel cannot take the place of evidence in the record. In re Schulze 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). The evidence of unexpected results must be supported by an appropriate affidavit or declaration. See MPEP 716.02.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.


If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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07/23/04


FRANKIE L. STINSON
PRIMARY EXAMINER
GROUP 3400 1700